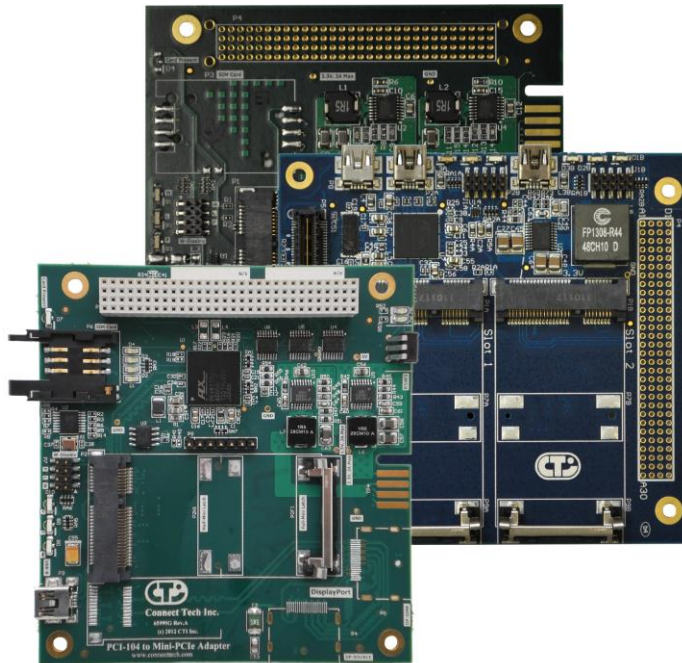




Connect Tech Inc.
Embedded Computing Experts

PCIe/104 and PCI-104 to Single/Dual Mini-PCIe Card Adapters

User Manual



Connect Tech Inc.
42 Arrow Road
Guelph, Ontario
N1K 1S6

Tel: 519-836-1291
Toll Free: 800-426-8979 (North America only)
Fax: 519-836-4878
Email: sales@connecttech.com
support@connecttech.com
Web: www.connecttech.com

CTIM-00110 Revision 0.01, Oct. 16, 2012

Limited Lifetime Warranty

Connect Tech Inc. provides a lifetime warranty for all of our products. Should this product, in Connect Tech Inc.'s opinion, fail to be in good working order during the warranty period, Connect Tech Inc. will, at its option, repair or replace this product at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster or non Connect Tech Inc. authorized modification or repair.

You may obtain warranty service by delivering this product to an authorized Connect Tech Inc. business partner or directly to Connect Tech Inc. along with proof of purchase. Product returned to Connect Tech Inc. must be pre-authorized by Connect Tech Inc. with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured and packaged for safe shipment. Connect Tech Inc. will return this product by prepaid ground shipment service.

The Connect Tech Inc. lifetime warranty is defined as the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, Connect Tech Inc. reserves the right to substitute an equivalent product if available or to retract lifetime warranty if no replacement is available.

The above warranty is the only warranty authorized by Connect Tech Inc. Under no circumstances will Connect Tech Inc. be liable in any way for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, such product.

Copyright Notice

The information contained in this document is subject to change without notice. Connect Tech Inc. shall not be liable for errors contained herein or for incidental consequential damages in connection with the furnishing, performance, or use of this material. This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Connect Tech Inc.

Copyright © 2012 by Connect Tech Inc.

Trademark Acknowledgment

Connect Tech Inc. acknowledges all trademarks, registered trademarks and/or copyrights referred to in this document as the property of their respective owners.

Not listing all possible trademarks or copyright acknowledgments does not constitute a lack of acknowledgment to the rightful owners of the trademarks and copyrights mentioned in this document.

Table of Contents

Limited Lifetime Warranty	2
Copyright Notice.....	2
Trademark Acknowledgment.....	2
Table of Contents.....	3
Revision History	3
Customer Support Overview.....	4
Contact Information.....	4
Introduction.....	5
PCIe/104 Product Specifications.....	5
PCI-104 Product Specifications	6
Board Diagrams	7
<i>Single Mini-PCIe Slot model, top view</i>	7
<i>Dual Mini-PCIe Slot model</i>	7
<i>Single Slot, PCI-104 Model</i>	8
<i>Hardware Description</i>	9
<i>PCIe Lanes</i>	9
<i>Mini-PCIe connectors</i>	9
<i>USB Client Connections to Mini-PCIe modules</i>	9
USB Host Connections from PCIe/104 Stack.....	10
<i>Diagnostic LEDs</i>	10
<i>Single and Dual Adapters</i>	10
<i>Dual Adapter PCIe link status LEDs</i>	11
<i>Diagnostic LED Header</i>	12
Hardware Installation Information.....	13

Revision History

Revision	Date	Author(s)	Change(s)
0.00	Sept. 04, 2012	KM	Initial Manual Revision Created
0.01	Oct. 16, 2012	RD	Add PCI-104 models.

Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech Inc. reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Our support section is available 24 hours a day, 7 days a week on our website at: www.connecttech.com/sub/support/support.asp. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

Contact Information

We offer three ways for you to contact us:

Mail/Courier

You may contact us by letter at: Connect Tech Inc.
Technical Support
42 Arrow Road, Guelph, ON
Canada N1K 1S6

Email/Internet

You may contact us through the Internet. Our email and URL addresses on the Internet are:

sales@connecttech.com
support@connecttech.com
www.connecttech.com

Note:

Please go to the [Download Zone](#) or the [Knowledge Database](#) in the [Support Center](#) on the Connect Tech Inc. website for product manuals, installation guides, device driver software and technical tips. Submit your technical support questions to our customer support engineers via the [Support Center](#) on the Connect Tech Inc. website.

Telephone/Facsimile

Technical Support representatives are ready to answer your call Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Telephone: 800-426-8979 (North America only)
Telephone: 519-836-1291 (Live assistance available 8:30 a.m. to 5:00 p.m. EST,
Monday to Friday)
Facsimile: 519-836-4878 (online 24 hours)

Introduction

Connect Tech's PCIe/104 and PCI-104 to Single/Dual Mini-PCIe Card Adapters easily enable integration of a Mini-PCIe (PCI Express Mini) card into a PCIe/104 or PCI/104 Express or PCI-104 system.

PCIe/104 (or PCI-104) to Single/Dual Mini-PCIe Card Adapters are fully compatible with any Mini-PCIe peripheral, expanding the capabilities of an existing PCIe/104 or PCI/104 Express system, adding features such as WiFi, GPS, Bluetooth, SSD storage and WLAN broadband communications.

The PCIe/104 (or PCI-104) to Single/Dual Mini-PCIe Card Adapter can also support optional Mini-PCIe features such as USB and SIM Card usage for WLAN applications.

PCIe/104 Product Specifications

Specification	ADG028	ADG036	ADG044	ADG049	ADG050	ADG051
Mini-PCIe Module Slots	1	1	2	2	2	2
PCIe/104 x1/x3	X1	X3	X3	X3	X1	X1
PCI-104 (Pass Through)	N	Y	Y	N	Y	N
Client USB to Mini-PCIe	N	Y	Y	Y	Y	Y
Host USB from PCIe/104	N	Y	Y	Y	Y	Y
SIM Card for WLAN	Y	Y	Y	Y	Y	Y
Diagnostic LEDs	Y	Y	Y	Y	Y	Y
Diagnostic PCIe Link LEDs	N	N	Y	Y	Y	Y
Dimensions	Length: 9.02 cm/3.55” Width: 9.6cm/3.78”					
Temperature	-40C to +85C (-40F to 185F)					
Bus	PCIe/104 Type 1 or Type 2					
Power Consumption +5V	No Modules installed 50mA. 1 module installed using peak power as per spec ^[1] up to 2200mA ^[2]		No Modules installed 450mA. 2 modules installed using peak power as per spec ^[1] up to 4500mA ^[2]			
System Requirements	PC/104 Express Stack					
	+5V Power from PCIe/104 stack					
	One x1 lane from PCIe/104 stack					

[1] "Spec" refers to the "PCI Express Mini Card Electromechanical Specification Revision 2.0"

[2] Assumes an on board voltage regulator efficiency of 88%.

PCI-104 Product Specifications

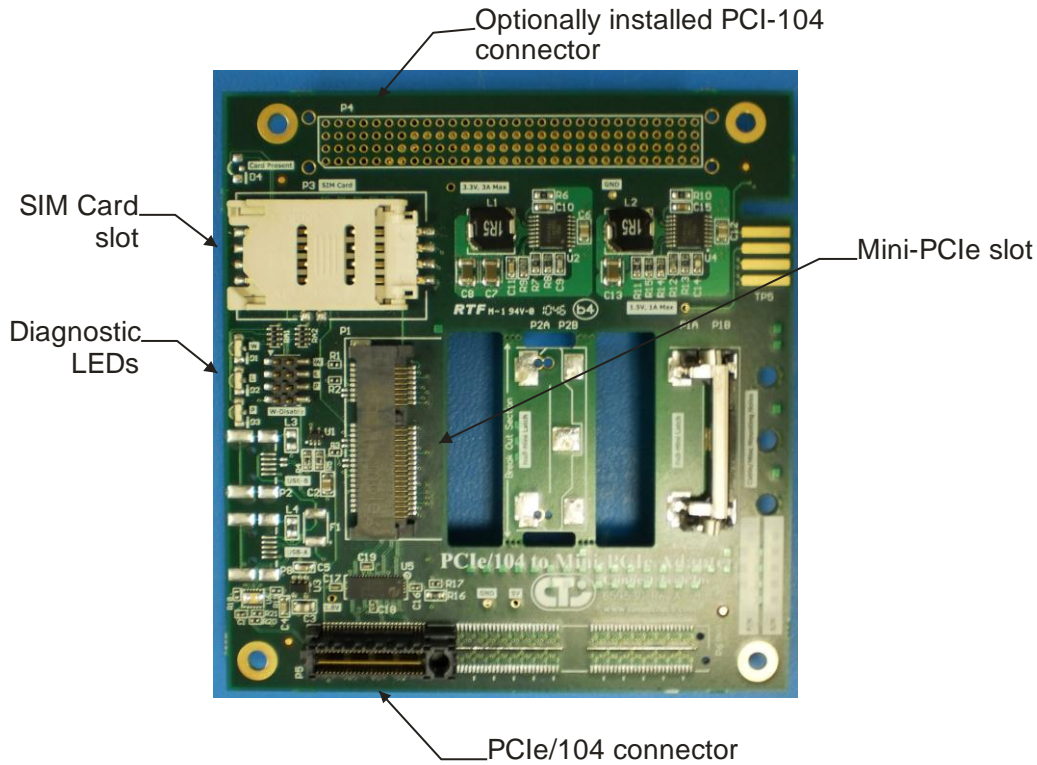
Specification	ADG046	ADG047	ADG048			
Mini-PCle Module Slots	1 (52 pin)	1 (76 pin)	1 (76 pin)			
Client USB to Mini-PCle	Y	Y	Y			
SIM Card for WLAN	Y	Y	Y			
Display Port	N	Y (Sink)	Y (Source)			
Diagnostic LEDs	Y	Y	Y			
Dimensions	Length: 9.02 cm/3.55” Width: 9.6cm/3.78”					
Temperature	-40C to +85C (-40F to 185F)					
Bus	PCI-104					
Power Consumption +5V	No Modules installed 50mA. 1 module installed using peak power as per spec ^[1] up to 2200mA ^[2]		No Modules installed 450mA. 2 modules installed using peak power as per spec ^[1] up to 4500mA ^[2]			
System Requirements	PCI-104 Stack					
	+5V Power from PCI-104 stack					

[1] "Spec" refers to the "PCI Express Mini Card Electromechanical Specification Revision 2.0"

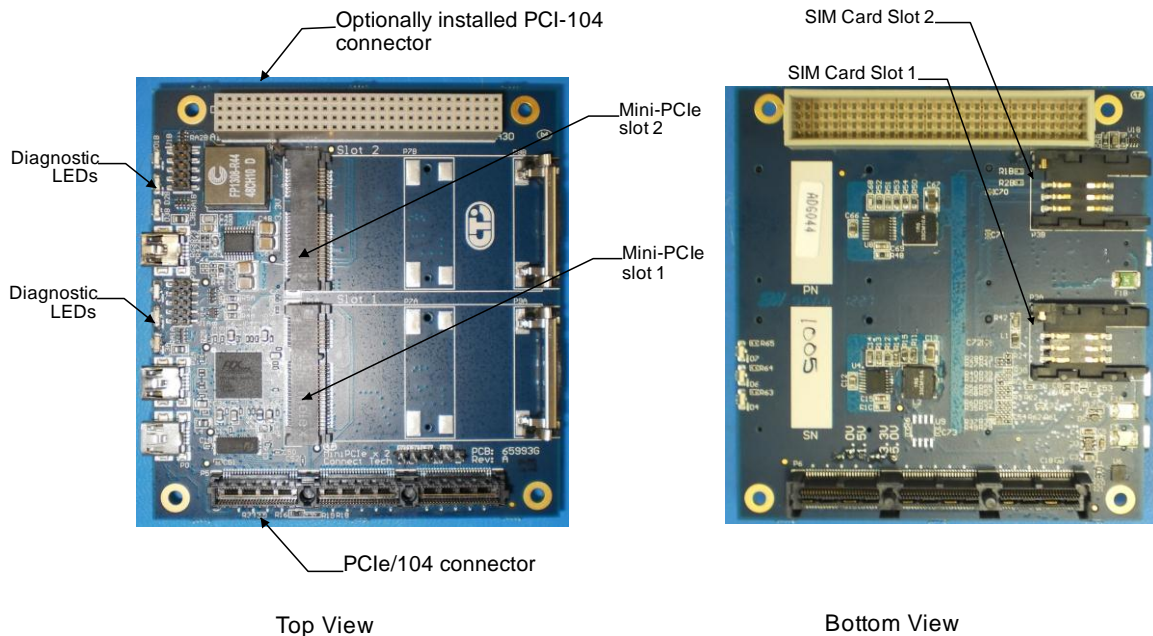
[2] Assumes an on board voltage regulator efficiency of 88%.

Board Diagrams

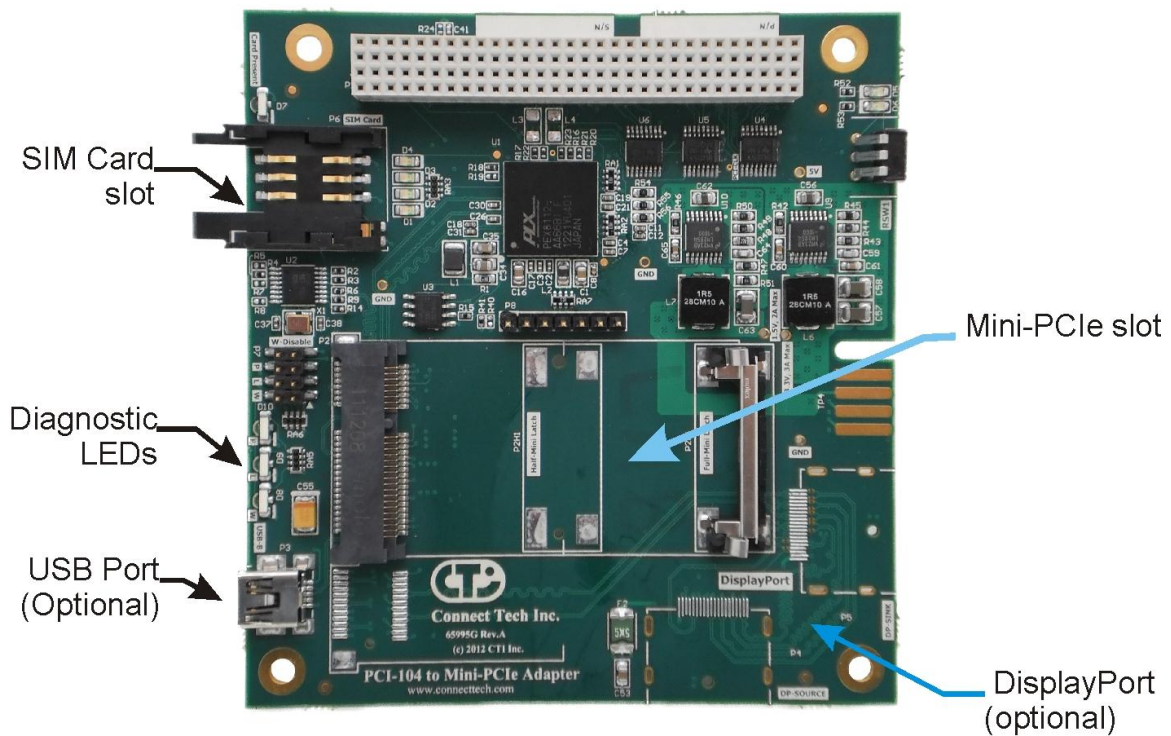
Single Mini-PCle Slot model, top view



Dual Mini-PCle Slot model



Single Slot, PCI-104 Model



Hardware Description

PCIe Lanes

Both of the Single and Dual Mini-PCIe adapters only use one PCIe x1 lane from Bank0 of the PCIe/104 stack.

The Dual Mini-PCIe adapter uses a PLX8603 Switch to adapt the PCIe x1 lane from Bank0 to two x1 lane on the adapter card.

Mini-PCIe connectors

The adapters feature slots for standard card edge, full length Mini-PCIe boards.

Mini-PCIe cards should only be installed when the power is switched off.

The Mini-PCIe connector is the 6.5mm height variety.

SIM Cards

The adapters feature mini-SIM (2FF) size sockets for use with 6 pin SIM cards. The SIM card size should be 0.76mm x 25mm x 15mm.

SIM cards should only be installed when the power is switched off.

USB Client Connections to Mini-PCIe modules

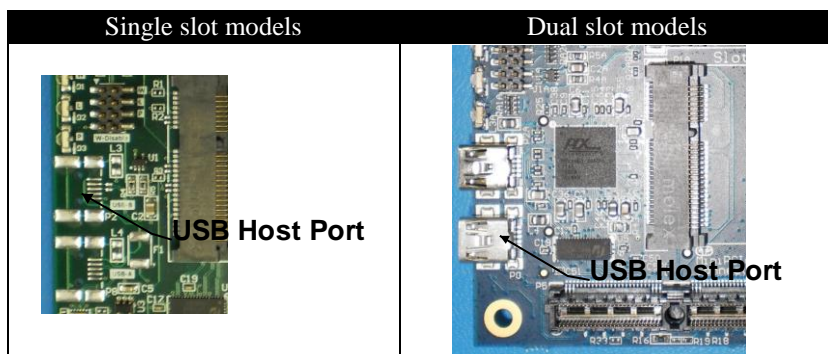
Some models of the Single Mini-PCIe slot, and all models of the Dual Mini-PCIe slot adapter feature a USB client mode connector for use with Mini-PCIe modules that feature a USB connection. Some network LAN and WLAN cards have this feature.

To use this feature, you will need to source a standard **Mini-B to Type A** USB cable, for example **Cables to Go**, PN: 27329.

You will also require a spare USB port from your PCIe/104 system.

USB Host Connections from PCIe/104 Stack

Some models of the Single Mini-PCIe and all models of the Dual Mini-PCIe adapter feature one of the USB lanes from the Bank 0 of the PCIe/104 stack. One of the USB lanes is brought out to a USB Type B connector, see below.



To use this feature, you will need to source a standard **Mini-A to Mini-B** USB cable, for example **Digi-Key**, PN: WM17494

Diagnostic LEDs

Single and Dual Adapters

The adapters feature three diagnostic LEDs for each Mini-PCIe slot as follows

Single Mini-PCIe Model

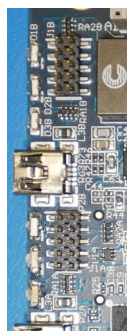
WWAN
WLAN
WPAN



Dual Mini-PCIe Model

WWAN
WLAN
WPAN

WWAN
WLAN
WPAN



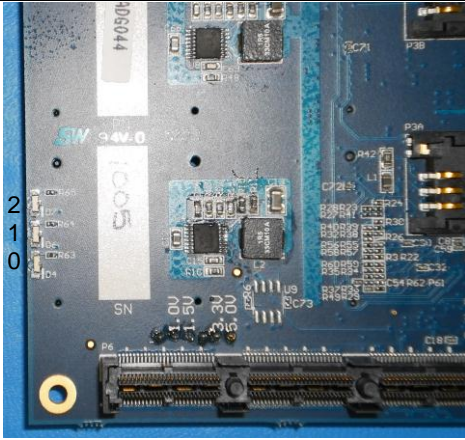
Single Mini-PCIe Model (PCI-104)

WPAN
WLAN
WWAN



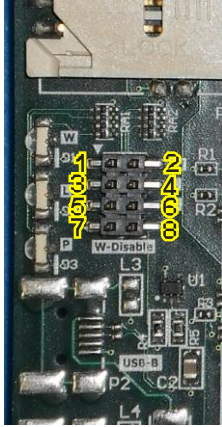
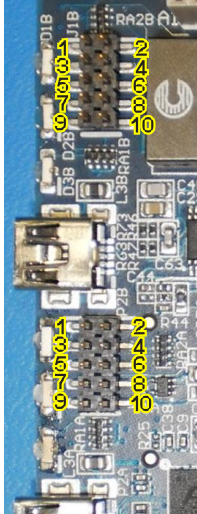
Dual Adapter PCIe link status LEDs

The Dual Adapter provides PCIe link status LEDs on the PCB. They can be found on the bottom side as shown below.

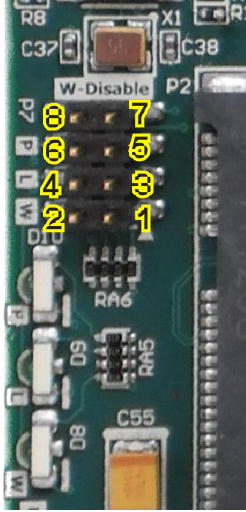
	LED Activity	Meaning
	Off	No PCIe link
	Blinking 0.5 Hz	Gen1 / 2.5 GBS Link acquired
	On	Gen2 / 5 GBS Link acquired
	LED	LED Relationship
	PCIe Lane 0	Link to PCIe/104 stack
	PCIe Lane 1	Link to Mini-PCIe 1
	PCIe Lane 2	Link to Mini-PCIe 2

Diagnostic LED Header

The Diagnostic LEDs are brought out to a header so that off-board LEDs could be used. The header pinouts are:

Pin		Single Mini-PCIe Model	Dual Mini-PCIe Model
1	470 Ohm resistor to +3.3V		
2	To LED_WWAN pin on MiniPCIe socket		
3	470 Ohm resistor to +3.3V		
4	To LED_WLAN pin on MiniPCIe socket		
5	470 Ohm resistor to +3.3V		
6	To LED_WPAN pin on MiniPCIe socket		
7	GND		
8	W_Disable pin on MiniPCIe socket		
9	No Connect - Only on 2xMiniPCIe slot model		
10	No Connect - Only on 2xMiniPCIe slot model		

PCI-104 Model

Pin		
1	470 Ohm resistor to +3.3V	
2	To LED_WWAN pin on MiniPCIe socket	
3	470 Ohm resistor to +3.3V	
4	To LED_WLAN pin on MiniPCIe socket	
5	470 Ohm resistor to +3.3V	
6	To LED_WPAN pin on MiniPCIe socket	
7	GND	
8	W_Disable pin on MiniPCIe socket	

Hardware Installation Information

Please follow these steps with installing the adapter into your system.

- 1) Ensure your PC/104 Express (or PCI-104) System is powered OFF.
- 2) Install the adapter onto your PC/104 Express (or PCI-104) stack.
- 3) Install your Mini-PCIe module(s) and SIM card (if required) onto the adapter.
- 4) Power ON your PCIe/104 (or PCI-104) System.